

Claims

- 1 Apparatus for controlling the amount of data used to transmit still images during or after the transmission of a video sequence from a first to a second location, the apparatus comprising:
- 5 encoding means arranged for intraframe encoding still images for transmission and intraframe encoding part or all of selected video sequence frames;
calculating means for determining the data size of intraframe encoded video sequence frames; and
control means for controlling intraframe encoding of still images for transmission in
10 dependence on the determined intraframe encoded size of a previous video sequence frame.
2. Apparatus according to claim 1, in which the encoding means is arranged to intraframe encode part or all of each video sequence frame and the control means is
15 arranged to control intraframe encoding of a still image in dependence on the determined size of the most recently intraframe encoded video sequence frame.
3. Apparatus according to claim 1 or claim 2 in which the control means is arranged to select a quantization factor for use in encoding of a still image in dependence on the
20 determined intraframe encoded size of a previous video sequence frame.
4. Apparatus according to claim 1 or claim 2 in which the control means is arranged to select, in dependence on the determined intraframe encoded size of a previous video sequence frame, a first quantization factor for use in encoding a first part of a still
25 image and a second quantization factor for use in encoding a second part of a still image.
5. Apparatus according to any preceding claim in which the encoding means is arranged to carry out an encoding process in which an image is considered to comprise a plurality of blocks, each of which is intraframe encoded.
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6. Apparatus according to any preceding claim in which the control means is arranged to control intraframe encoding of still images with the aim of keeping the data size of the encoded image within predetermined limits.
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7. Apparatus according to any preceding claim in which the encoding and transmission of the still images is compatible with the scheme used for encoding and transmitting of the video sequence.

8. A method for controlling the amount of data used to transmit still images during or after the transmission of a video sequence from a first to a second location, the method comprising the steps of:
- intraframe encoding part or all of selected video sequence frames;
- 5 determining the data size of intraframe encoded video sequence frames; and
- when sending a still image, controlling intraframe encoding of said image in dependence on the determined intraframe encoded size of a previous video sequence frame.
9. A method according to claim 8, comprising the steps of intraframe encoding part or
- 10 all of each video sequence frame and controlling intraframe encoding of a still image in dependence on the determined size of the most recently intraframe encoded video sequence frame.
10. A method according to claim 8 or claim 9, comprising the step of selecting a
- 15 quantization factor for use in encoding a still image in dependence on the determined intraframe encoded size of a previous video sequence frame.
11. A method according to claim 8 or claim 9 comprising the step of selecting, in dependence on the determined intraframe encoded size of a previous video sequence
- 20 frame, a first quantization factor for use in encoding a first part of a still image and a second quantization factor for use in encoding a second part of a still image.
12. A method according to any one of claims 8 to 11 in which the encoding process is one in which an image is considered to comprise a plurality of blocks each of which is
- 25 intraframe encoded.
13. A method according to any one of claims 8 to 12 in which the intraframe encoding of still images is conducted with the aim of keeping the data size of the encoded image within predetermined limits.
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14. A method according to any one of claims 8 to 13 in which the encoding and transmission of the still images is compatible with the scheme used for encoding and transmitting of the video sequence.
- 35 15. Apparatus for controlling the amount of data used to transmit still images, the apparatus being suitable for use during the transmission of a video sequence from a first to a second location and comprising:

encoding means arranged for intraframe encoding still images for transmission, the encoding process being one in which a still image is considered to comprise a plurality of blocks each of which is intraframe encoded;

calculating means for determining the data size of intraframe encoded blocks; and

- 5 control means for controlling encoding of selected blocks in dependence on the determined data size of one or more previously encoded block.

16. Apparatus according to claim 15 in which the control means is arranged to select a quantization factor for use in encoding of a selected block in dependence on the
10 determined size of one or more previously encoded block.

17. Apparatus according to claim 15 or claim 16 in which the control means is arranged to select a quantization factor for use in encoding of a selected block by incrementing or decrementing a quantization factor used for a previously encoded
15 block.

18. Apparatus according to claim 17 in which the control means comprises means for calculating the average data size of previously encoded blocks within the respective image, the control means being arranged to select the quantization factor for use in
20 encoding of a selected block by incrementing a quantization factor used for a previously encoded block where the average data size falls on one side of a target range or value and by decrementing a quantization factor used for a previously encoded block where the average data size falls on an opposite side of the target range or value.

- 25 19. Apparatus according to claim 17 or claim 18 in which a maximum limit to the change in quantization factor caused by each incrementation or decrementation is chosen to limit undesirable visual effects in decoded images.

20. Apparatus according to any one of claims 17, 18 and 19 in which the quantization
30 factor is kept constant for a selected number of consecutive blocks, the selected number being chosen to limit undesirable visual effects in decoded images.

21. Apparatus according to any one of claims 15 to 20 in which the control means is arranged to control intraframe encoding of still images with the aim of keeping the
35 data size of the encoded image within predetermined limits.

22. Apparatus according to any one of claims 15 to 21 in which the control means is arranged to select the quantization factors for blocks in a selected part of a still image

to give a desired image quality and to select the quantization factors for the remainder of the still image on the basis of a desired data size for the complete encoded image.

23. Apparatus according to any one of claims 15 to 22 in which the encoding and
5 transmission of the still images is compatible with the scheme used for encoding and transmitting of the video sequence.
24. A method for controlling the amount of data used to transmit still images, the
10 method being suitable for use during the transmission of a video sequence from a first to a second location and comprising the steps of:
intraframe encoding still images for transmission, the encoding process being one in
which a still image is considered to comprise a plurality of blocks each of which is
intraframe encoded;
15 determining the data size of intraframe encoded blocks; and
controlling encoding of selected blocks in dependence on the determined data size of
one or more previously encoded block.
25. A method according to claim 24 comprising the step of selecting a quantization
20 factor for use in encoding of a selected block in dependence on the determined size of one or more previously encoded block.
26. A method according to claim 24 or claim 25 comprising the step of selecting a
25 quantization factor for use in encoding of a selected block by incrementing or decrementing a quantization factor used for a previously encoded block.
27. A method according to claim 26 comprising the steps of:
calculating the average data size of previously encoded blocks within the respective
image; and
30 selecting the quantization factor for use in encoding a selected block by incrementing a quantization factor used for a previously encoded block where the average data size
falls on one side of a target range or value and by decrementing a quantization factor
used for a previously encoded block where the average data size falls on an opposite
side of the target range or value.
- 35 28. A method according to claim 26 or claim 27 in which a maximum limit to the change in quantization factor caused by each incrementation or decrementation is chosen to limit undesirable visual effects in decoded images.

29. A method according to any one of claims 26, 27 and 28 in which the quantization factor is kept constant for a selected number of consecutive blocks, the selected number being chosen to limit undesirable visual effects in decoded images.
- 5 30. A method according to any one of claims 24 to 29 in which the intraframe encoding of still images is conducted with the aim of keeping the data size of the encoded image within predetermined limits.
- 10 31. A method according to any one of claims 24 to 30 comprising the steps of first selecting the quantization factors for blocks in a selected part of a still image to give a desired image quality and subsequently selecting the quantization factors for the remainder of the still image on the basis of a desired data size for the complete encoded image.
- 15 32. A method according to any one of claims 24 to 31 in which the encoding and transmission of the still images is compatible with the scheme used for encoding and transmitting of the video sequence.
- 20 33. Apparatus for controlling the amount of data used to transmit still images, the apparatus being suitable for use during the transmission of a video sequence from a first to a second location and comprising:
encoding means arranged for intraframe encoding still images for transmission, the encoding process being one in which a still image is considered to comprise a plurality of blocks each of which is intraframe encoded;
25 calculating means for determining the data size of part of an intraframe encoded image comprising at least one intraframe encoded block;
judging means for determining whether the determined data size of said part of an intraframe encoded image falls within a preselected range; and
control means for causing re-encoding of said part of an intraframe coded frame, prior
30 to transmission, in such a way as to change the data size of said part of an intraframe coded image when the determined data size falls outside the preselected range.
34. Apparatus according to claim 33 in which the control means is arranged to select quantization factors for use in encoding and re-encoding still images.
- 35 35. Apparatus according to claim 34 in which the control means is arranged to change the data size of said part of an intraframe coded image, when re-encoding said part, by

selecting a quantization factor different from that used in the previous encoding of said part.

- 5 36. Apparatus according to any one of claims 33 to 35 in which the control means is arranged to cause repetition of the re-encoding process until the determined data size falls within the preselected range.
- 10 37. Apparatus according to any one of claims 33 to 36 in which a desired data size for the whole of an encoded image is chosen and the preselected range for parts of the image are determined by assigning desired data sizes to parts in accordance with the relative physical size of each part of the image.
- 15 38. Apparatus according to any one of claims 33 to 37 in which a desired data size for the whole of an encoded image is chosen and the preselected range for parts of the image are determined by assigning desired data sizes to parts in accordance with the relative importance of each part of the image.
- 20 39. Apparatus according to any one of claims 33 to 38 in which said part of an intraframe coded image comprises a Group of Blocks.
40. Apparatus according to any one of claims 33 to 39 in which the control means is arranged to control intraframe encoding of still images with the aim of keeping the data size of the encoded image within predetermined limits.
- 25 41. Apparatus according to any one of claims 33 to 40 in which the encoding and transmission of the still images is compatible with the scheme used for encoding and transmitting of the video sequence.
- 30 42. A method for controlling the amount of data used to transmit still images, the method being suitable for use during the transmission of a video sequence from a first to a second location and comprising the steps of:
intraframe encoding still images for transmission, the encoding process being one in which a still image is considered to comprise a plurality of blocks each of which is intraframe encoded;
- 35 determining the data size of part of an intraframe encoded frame comprising at least one intraframe encoded block;
determining whether the determined data size of said part of an intraframe coded frame falls within a preselected range; and

when the determined data size falls outside the preselected range, re-encoding said part of an intraframe coded frame, prior to transmission, in such a way as to change the data size.

- 5 43. A method according to claim 42 comprising the step of selecting quantization factors for use in encoding and re-encoding still images.

44. A method according to claim 43 comprising the step of, when re-encoding said part of an intraframe coded image, selecting a quantization factor which is different
10 from that used in the previous encoding of said part.

45. A method according to any one of claims 42 to 44 comprising the step of repeating the re-encoding process until the determined data size falls within the preselected range.

- 15 46. A method according to any one of claims 42 to 45 comprising the steps of choosing a desired data size for the whole of an encoded image and determining the preselected range for parts of the image by assigning desired data sizes to parts in accordance with the relative physical size of each part of the image.

- 20 47. A method according to any one of claims 42 to 46 comprising the steps of choosing a desired data size for the whole of an encoded image and determining the preselected range for parts of the image by assigning desired data sizes to parts in accordance with the relative importance of each part of the image.

- 25 48. A method according to any one of claims 42 to 47 in which said part of an intraframe coded image comprises a Group of Blocks.

49. A method according to any one of claims 42 to 48 in which the control means is arranged to control intraframe encoding of still images with the aim of keeping the
30 data size of the encoded image within predetermined limits.

50. A method according to any one of claims 42 to 49 in which the encoding and transmission of the still images is compatible with the scheme used for encoding and transmitting of the video sequence.
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